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DRAWINGS ATTACHED

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(54) BEARING ASSEMBLIES, FOR EXAMPLE INTERMEDIATE SHAFT BEARING ASSEMBLIES IN MOTOR VEHICLES

(71) We, DAIMLER-BENZ AKTIENGESELLSCHAFT, a Company organised under the laws of Germany, of P.O. Box 202, 7000 Stuttgart 60, Germany, do hereby declare

the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to bearing assemblies, particularly but not exclusively intermediate shaft bearings for the transmission or propeller shaft of motor vehicles, and including a resilient deformation body consisting for example of rubber located between two rigid ring parts, a rigid outer ring, being rigidly secured against rotation for example in a cardan tube, while the rigid inner ring houses a bearing for the shaft.

Bearings of the above type in motor vehicles often result in loud noises inside the passenger compartment. The use of softer resilient bodies — by which better noise damping should have been achieved — was hitherto unsuccessful due to the consequently shortened working life of such bearings.

The invention is therefore based on the problem of avoiding the disadvantages described, i.e. of providing a bearing assembly which provides good sound damping while possessing sufficient working life.

According to the invention there is provided a bearing assembly comprising a resiliently deformable body located between two concentric rigid annular members, the rigid outer member being secured against rotation, and the rigid inner ring accommodating a bearing for a shaft, wherein the deformable body consists of a plurality of peripherally distributed web members which connect the two rigid rings to each other and resilient abutments are attached to one of said rigid rings between said web members, the surface of each abutment which faces the other ring being at a distance from said other rigid ring.

The construction according to the invention provides a bearing assembly with a good working life and offering good noise damping properties. In the case of excessively pronounced deflections, the elastic abutments come into operation, so that these deflections are likewise effectively damped and are furthermore limited.

Any desired distribution of the webs and abutments over the periphery and also any desired number of web members or abutments, which need not correspond to one another, fall within the scope of the invention. However, in a preferred embodiment of the invention the web members are regularly distributed circumferentially, one abutment being provided between two web members.

In principle, it is immaterial whether the abutments are secured to the outer or the inner ring. Preferably four web members spaced by 90° with respect to one another are provided in planes which are inclined at 45° with respect to two radially extending planes which are perpendicular to one another and intersect at the centre of the bearing, the abutments being located in said planes and being attached to the outer of said rings.

In the case of one embodiment of the invention, the abutments have a smaller cross-section than the web members. This can be achieved by corresponding variation of their width or their extent in the peripheral direction or in both of these dimensions. Generally, therefore, the invention embodies the idea of imparting a different spring characteristic to the abutments from that given to the web members, which can basically be achieved by a different choice of material. Where the invention is concerned, a solution is preferred whereby the abutments have the same dimensions in the peri-

pheral direction as the web members but are narrower in the axial direction than the web members.

The web members may be stiffened in a known manner by rigid inlays. A further feature of the invention resides in that the free surfaces of the abutments are all at the same distance from the rigid ring opposite them. Having regard to the sag which occurs for example in a propeller shaft, this can be related to the operative position. It can however also relate to the manufacture of the bearing assembly, so that in operation an unequal distance may exist between the individual abutment surfaces and the rigid ring opposite them.

As already mentioned, the angular position of the web members and of the abutments can be freely chosen, i.e. they need not by any means be evenly distributed over the periphery. Similarly, it is not absolutely necessary always to have an abutment located between every two web members.

Details of the invention are illustrated by the exemplary embodiment shown in the attached drawings, in which:—

Figure 1 is a side view of a bearing assembly;

Figure 2 is a section along the line II-II in Figure 1 and,

Figure 3 is a section along the line III-III in Figure 2.

As shown in Figures 1 to 3, the bearing assembly is an intermediate bearing for a vehicle propellor shaft and consists of an outer rigid ring part 10 which comprises two parts 11 and 12, and which is secured against rotation on a rigid vehicle part, e.g. in the cardan tube (not shown) by means of the flange 13. A rigid inner ring 14 accommodates the bearing (not shown in greater detail) for the shaft. For this purpose, it has an annular flange 15 on one side against which the bearing — which can be inserted from the other side — is applied.

Between the two rigid rings 10 and 14 is the elastic body consisting of four web members 16 and four abutment members 17. The web members and abutment members are evenly distributed over the periphery, in fact in such a way that the abutment members 17 lie in planes which are vertical and horizontal with respect to the longitudinal direction of the vehicle, while the web members 16 are at an angle of 45° to these planes. The web members 16 connect the outer rigid ring 10 to the inner rigid ring 14. The abutment members 17 on the other hand are attached only to the outer rigid ring part 10 and their surfaces 18 are at a distance from the inner rigid ring 14. The arrangement is such that the inner ring 14 is coated over its entire periphery with a thin layer 19 of resilient material, so that the abutment members 17 never come in contact with the metal of the ring 14 itself.

Both the web parts 16 and also the abutment members 17 are narrower in width with respect to the rigid outer ring 10 and with respect to the rigid inner ring 14. Their extension in the peripheral direction is identical. Likewise, their axial width is identical and finally, the arrangement is such that the surfaces 18 of the abutment members 17 are all at the same distance 20 from the rigid inner ring 14.

The part 12 of the rigid outer ring 10 is of strip-like construction and has a somewhat smaller width than the part 11 which has a U-shaped cross-section, the arms 21 of the U-shaped section being directed radially outwards as shown in Figure 2.

WHAT WE CLAIM IS:—

1. A bearing assembly comprising a resiliently deformable body located between two concentric rigid annular members, the rigid outer member being secured against rotation, and the rigid inner ring accommodating a bearing for a shaft, wherein the deformable body consists of a plurality of peripherally distributed web members which connect the two rigid rings to each other and resilient abutments are attached to one of said rigid rings between said web members, the surface of each abutment which faces the other ring being at a distance from said other rigid ring.

2. A bearing assembly according to Claim 1, wherein the web members are evenly distributed over the periphery and one abutment is located between every two web members.

3. A bearing assembly according to Claim 2, wherein four web members spaced by 90° with respect to one another are provided in planes which are inclined at 45° with respect to two radially extending planes which are perpendicular to one another and intersect at the centre of the bearing, the abutments being located in said planes and being attached to the outer of said rings.

4. A bearing assembly according to Claim 3, wherein the abutments have a smaller cross-section than the web members.

5. A bearing assembly according to claim 4, wherein the abutments have the same dimension in the peripheral direction as the web members but are narrower in the axial direction than the web members.

6. A bearing assembly according to any one of Claims 1 to 5 wherein the resiliently deformable body is made of rubber.

7. A bearing assembly according to any one of Claims 1 to 6, wherein the web members are stiffened by rigid inserts.

8. A bearing assembly according to

any one of Claims 1 to 7, wherein the free surfaces of the abutments are all at the same radial distance from the opposed rigid ring.

9. A bearing assembly according to any one of Claims 1 to 8, wherein the rigid ring opposite the abutments has a layer of resilient material on those parts of its surface which are opposite the abutments.

10. A bearing assembly substantially as hereinbefore described with reference to the accompanying drawings.

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1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

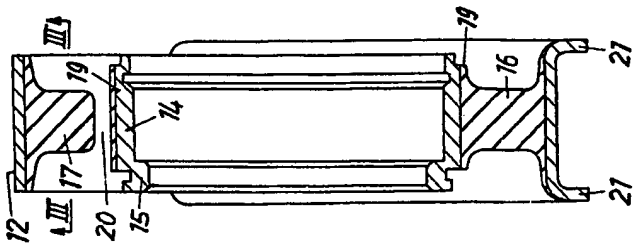

Fig.2

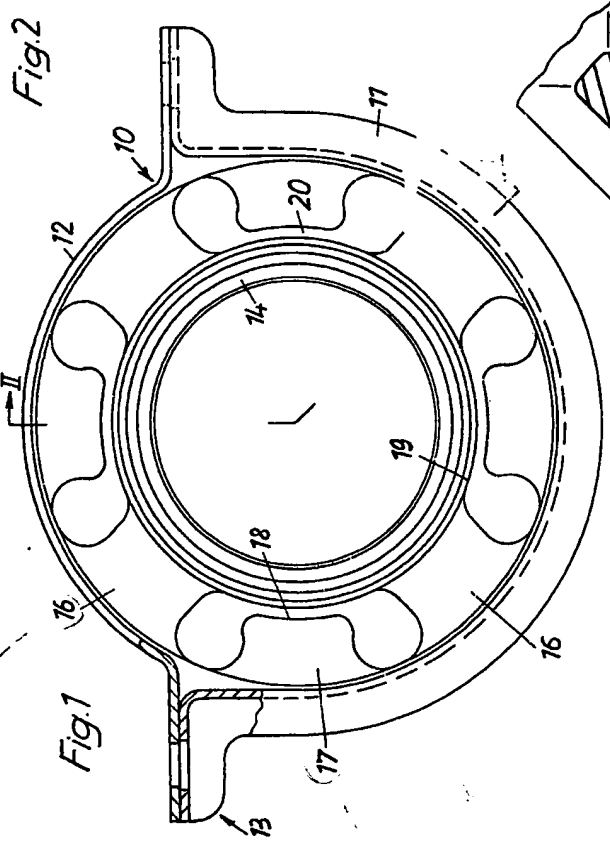

Fig.1

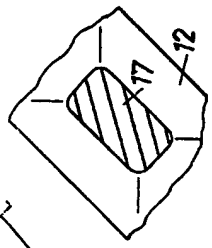

Fig.3